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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/024,581	12/21/2001	Hiroki Takeuchi	046103-5008	2484

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EXAMINER

LAM, CATHY FONG FONG

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 07/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/024,581	<b>Applicant(s)</b> TAKEUCHI ET AL.	
	<b>Examiner</b> Cathy Lam	<b>Art Unit</b> 1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on on April 23, 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5 and 8-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 8-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12-21-2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

In view of the amendment and remarks filed on April 23<sup>rd</sup> 2004, the pending claims are continued to be unpatentable as following:

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:
2. Claims 1-5 and 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Howard (US 5589714) or Hsiao et al (US 5292688) further in view of Thomas (US 5828126) or Lin et al (US 5468999) or Nishiyama (US 6324067).

Howard discloses a semiconductor device which is encapsulated (or embedded) in a thermosetting resin (col 2 L 19-22).

The thermosetting resin comprised of AlN particles and additives such as pigments or dyes (col 2 L 22-26 & col 5 L 49-51). The pigments or dyes is specifically carbon black material (col 7 L 13). The resin material has a dielectric constant of less than 10 (col 4 L 39).

The thermosetting resin is an epoxy resin which can be bisphenol epoxy resin, phenol epoxy novolac, or cresol epoxy novolac resins (col 5 L 18-22).

Hsiao teaches an encapsulant (7) which is used for bonding a semiconductor chip (1) to a substrate (2).

The semiconductor chip is encapsulated (or embedded) by the encapsulating composition (7) (see Fig.). The encapsulating composition (7) is comprised of an epoxy resin and an inorganic filler (col 5 L 1-5, 7-8 & col 4 L 63-65).

The encapsulant has a dielectric constant of less than 5.0 (col 6 L 23-24). The composition further comprises of an organic dye in an amount of less than about 0.2%. Such dye can be a blue tone or a carbon black (col 5 L 58-62).

Both Howard and Hsiao disclose the same material used as the claimed invention, it is inherent that Hsiao's encapsulant possess the same  $\tan\delta$  value, because  $\tan\delta$  is a property and property is materially dependent.

Both Howard and Hsiao disclose an encapsulating material in which an electronic component is embedded. Howard and Hsiao do not however teach a structure having a cavity or opening in which the electronic component resides and that the encapsulating material is used to fill the cavity or opening.

Thomas, Lin and Nishiyama disclose a multilayer structure comprised of a base substrate and a build up layer. The build up layers are made of wiring layers and insulating layers in an alternate manner (see Thomas 14a,14b,16a,16b, 22, 24,26,28; and Lin 18, 14, 16, and Nishiyama Figs. 10, 10a,10b, and 13-15). The examiner takes the position that the build up layers in the prior art resemble the core substrate as claimed by the applicant. These build up layers also comprising of conductive via holes (Thomas Fig. 2b numeral 20; Lin Fig. 3 numeral 22).

A cavity is formed in the build up layers, wherein an electronic component is formed within. An epoxy resin encapsulant is used to fill the cavity (Thomas col 6 L 24-26, Lin col 5 L 25-27, Nishiyama col 6 L 57-63 & L 15-18).

In Thomas, there is a wiring substrate which is formed over the build up layers (or core substrate), covering the cavity and is in contiguous contact with the core substrate below (Fig. 2b).

In view of the prior art teachings, one skill in the art would use Howard or Hsiao's encapsulating material over a component formed within a cavity because such structure is well known in the art.

Regarding to the distance between the wiring layer and the electrode, since applicant has not shown any advantages of such distance or such distance is for any particular reason. The examiner takes the position that the electrode and the wiring layer gap space under 30  $\mu\text{m}$  is obvious.

### ***Double Patenting***

3. Claims 1-5, 8-11 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1- 9 of copending Application No. 10/026,928 which has been allowed recently. Although the conflicting claims are not identical, they are not patentably distinct from each other because they are structurally and materially the same.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

Art Unit: 1775

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

### ***Drawings***

1. The drawings are objected to because the black ink is too dark in some of the drawings. Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Response to Arguments***

2. Applicant's arguments filed on April 23<sup>rd</sup> 2004 have been fully considered but they are not persuasive. Applicant disagrees with the art rejection and raises the following issues:

A. Hsiao does not show a structure having a cavity of opening in which the electronic component is embedded and filled with an encapsulant.

B. Neither Hsiao, Thomas, Lin nor Nishiyama teach or suggest a core substrate defining an opening, an electronic component embedded in the opening by an embedding resin, and a laminated build-up layer formed of an insulating and wiring layer disposed across the opening and in contiguous contact with the core substrate and the embedding resin.

3. In respond to the above issues:

A. Hsiao reference was to show the embedding resin which meets the claimed embedding resin.

B. Thomas teaches a wiring substrate (34) that is formed over the laminated build up layer and covering the cavity where the electronic component and the embedding resin reside (Fig. 2b).

4. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cathy Lam whose telephone number is (571) 272-1538. The examiner can normally be reached on 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (571) 272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



Art Unit: 1775

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Cathy Lam  
Primary Examiner  
Art Unit 1775

cfl  
July 26, 2004